

What is claimed is:

- 1 1. A storage device comprising:
2 a probe having a tip and a first plate;
3 a storage medium,
4 the tip of the probe adapted to form a dent in the storage medium to represent a
5 state of data bit; and
6 a second plate,
7 wherein the first plate and second plate cooperate to provide a variable
8 capacitance that varies between different capacitance values depending on whether the tip of
9 the probe is engaged in the dent.
- 1 2. The storage device of claim 1, further comprising a gas between the first and
2 second plates, the gas forming a dielectric of the variable capacitance.
- 1 3. The storage device of claim 1, wherein a layer of the storage medium forms at
2 least a part of the dielectric of the variable capacitance.
- 1 4. The storage device of claim 1, wherein the first and second plates are
2 separated by a first distance in response to the tip of the probe being in the dent, and
3 wherein the first and second plates are separated by a second, different
4 distance in response to the tip of the probe being engaged on a surface of the storage medium
5 but not in the dent.
- 1 5. The storage device of claim 4, wherein the variable capacitance has a first
2 capacitance value in response to the first and second plates being separated by the first
3 distance, and wherein the variable capacitance has a second capacitance value in response to
4 the first and second plates being separated by the second distance.
- 1 6. The storage device of claim 5, further comprising a measurement device to
2 measure a value of the variable capacitance during a read operation.

1 7. The storage device of claim 6, wherein the tip is heatable to an elevated
2 temperature to form the dent during a write operation.

1 8. The storage device of claim 7, further comprising storage cells in the storage
2 medium, the tip of the probe adapted to selectively form dents in respective storage cells to
3 represent states of corresponding data bits.

1 9. The storage device of claim 8, wherein presence of a dent in a storage cell
2 represents a first logical state of a corresponding data bit, and absence of a dent in a storage
3 cell represents a second logical state of a corresponding data bit.

1 10. The storage device of claim 1, wherein the variable capacitance comprises a
2 first variable capacitance, and wherein the probe has a third plate electrically connected to the
3 first plate,
4 the storage device further comprising a fourth plate spaced apart from the third
5 plate,
6 wherein the third plate and fourth plate cooperate to provide a second variable
7 capacitance that varies between different capacitance values depending on whether the tip of
8 the probe is engaged in the dent.

1 11. The storage device of claim 10, wherein the first and second variable
2 capacitances are arranged in parallel, the storage device further comprising a capacitance
3 measurement device to measure an overall capacitance provided by the first and second
4 variable capacitances.

1 12. The storage device of claim 10, wherein the storage medium is between the
2 probe and a plane containing the second and fourth plates.

1 13. The storage device of claim 10, wherein the probe is between the storage
2 medium and a plane containing the second and fourth plates.

1 14. The storage device of claim 1, wherein the storage medium is between the
2 probe and the second plate.

1 15. The storage device of claim 1, wherein the probe is between the second plate
2 and the storage medium.

1 16. A system comprising:
2 a processor; and
3 a storage device comprising:
4 a probe having a tip and a first plate;
5 a storage medium,
6 the tip of the probe to form a dent in the storage medium during a write
7 operation; and
8 a second plate spaced apart from the first plate,
9 wherein the first plate and the second plate cooperate to provide a
10 variable capacitance that varies between different capacitance values depending on whether
11 the tip of the probe is engaged in the dent.

1 17. The system of claim 16, wherein the storage device further comprises circuitry
2 to measure a value of the variable capacitance to detect a storage state.

1 18. The system of claim 16, wherein the first and second plates are separated by a
2 first distance in response to the tip of the probe being in the dent, and
3 wherein the first and second plates are separated by a second, different
4 distance in response to tip of the probe being on a surface of the storage medium but not in
5 the dent.

1 19. The system of claim 16, wherein the storage device further comprises:
2 a second probe having a tip and a third plate, the tip of the second probe
3 adapted to form a second dent in the storage medium; and
4 a fourth plate spaced apart from the third plate,
5 wherein the third plate and fourth plate cooperate to provide a variable
6 capacitance that varies between different values depending on whether the tip of the second
7 probe is engaged in the second dent.

1 20. The system of claim 16, wherein the storage medium comprises a plurality of
2 storage cells, wherein the tip of the probe is adapted to program a first one of the storage cells
3 by forming a dent in the first storage cell, and to program a second one of the storage cells by
4 not forming the dent in the second storage cell.

1 21. The system of claim 16, wherein the probe comprises a nanotechnology probe.

1 22. A method of reading data in a storage device, comprising:
2 scanning a probe over a storage medium having dents formed in the storage
3 medium, wherein the probe has a tip and a first plate;
4 engaging the tip of the probe at a first position on the storage medium such
5 that the tip engages a dent, wherein the first plate of the probe cooperates with a spaced apart
6 second plate to form a first capacitance at the first position; and
7 positioning the probe at a second, different position on the storage medium
8 such that the tip of the probe is not engaged in a dent, wherein the first plate and the spaced
9 apart second plate cooperate to form a second capacitance at the second position, the second
10 capacitance being different from the first capacitance.

1 23. The method of claim 22, wherein the first plate and the second plate cooperate
2 to form a variable capacitance, the method further comprising:
3 measuring a value of the variable capacitance.

1 24. The method of claim 23, wherein measuring the value of the variable
2 capacitance is performed with a measurement device, the measurement device measuring a
3 first capacitance value in response to the tip of the probe being engaged in a dent, and the
4 measurement device measuring a second capacitance value in response to the tip of the probe
5 not being engaged in a dent.

1 25. The method of claim 24, further comprising detecting one of the first
2 capacitance value and the second capacitance value during a read operation.

- 1 26. The method of claim 25, further comprising using the tip of the probe to form
2 the dents during a write operation.